Green Building Challenge 2000
Défi bâtiment écologique 2000

United States GBC 2000 Team

Supporting green buildings and communities for a healthy and prosperous planet





OFFICE OF
BUILDING TECHNOLOGY,
STATE AND COMMUNITY PROGRAMS

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Défi bâtiment écologique 2000

U.S. TEAM

Along with 19 other countries, the United States accepted the Green Building Challenge, an international effort to evaluate and improve the performance of green buildings. GBC started out as a competition to see which country had the greenest buildings and evolved into a cooperative process among countries to measure the performance of green buildings. While the auto industry can measure efficiency by miles per gallon, the buildings industry has no standard way to measure a building's energy and environmental performance. The founders of the Green Building Challenge hope that better tools for measuring green buildings will lead to a higher level of performance for green buildings. The ultimate goal is to develop buildings that contribute to global sustainability by conserving natural resources and minimizing energy use.

The U.S. Green Building Challenge Team selected five buildings to serve as case studies and then assessed the buildings' performance using an evaluation tool developed for the GBC. Teams from throughout the world selected case studies and used the same tool, called the Green Building Assessment Tool (GBTool). The goal is to improve the evaluation software tool so that it can be used internationally, while taking into account regional or national conditions. GBTool helps to assess and evaluate the energy and environmental performance of three building types: schools, multifamily residences, and small-scale office buildings.

The following five projects were selected not only because they are green, but also because building data was available as inputs to the software tool. The tool has been refined since the first Green Building Challenge in 1998, and participating countries are providing feedback to further improve the tool at the Green Building Challenge 2000 meeting in The Netherlands, part of the Sustainable Building 2000 International Conference. The conference brings together green building professionals from around the globe.

FOR MORE INFORMATION about the GBC 2000 U.S. Team, contact us or visit the U.S. Team Web site at ***www.eren.doe.gov/buildings/gbc2000/.***

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READING THE RESULTS

The green buildings shown here are evaluated on a number of criteria. Each category is rated on a scale from -2 to 5, where 0 indicates the current building standard in the topic area—the higher the rating, the better the building performance. A rating of 5 in "Energy," for instance, indicates very low energy use, placing the building at the top of sustainable design in that category.

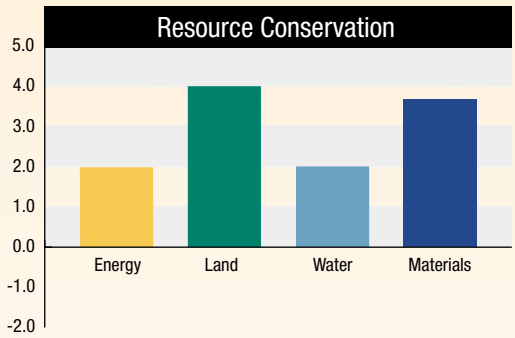
THOREAU CENTER FOR SUSTAINABILITY

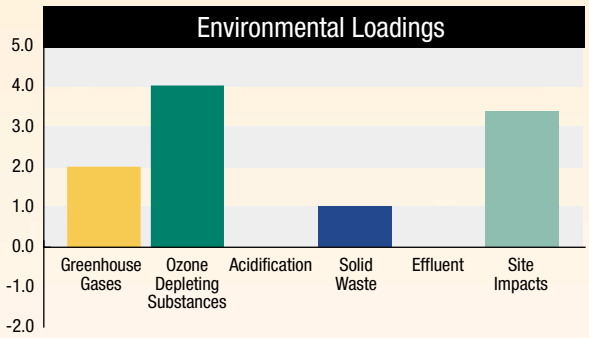
San Francisco, California

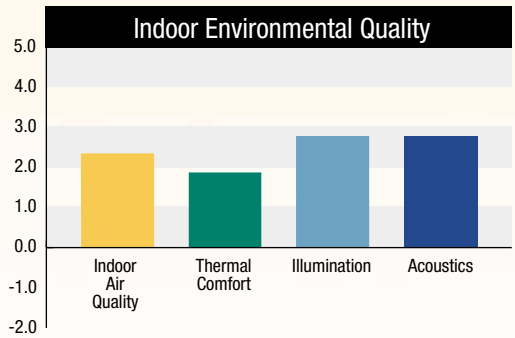
The 75,000-square-foot Thoreau Center for Sustainability is a historical building at the Presidio National Park, part of the Golden Gate National Recreation Area. The building, used in the past for hospital wards, now houses nonprofit organizations focused on environmental and sustainable development issues. Transforming the historic building into office space with new energy efficient building systems and green materials proved a challenge to the design team. For example, the facility's historic status precluded replacing the old windows with energy efficient windows.

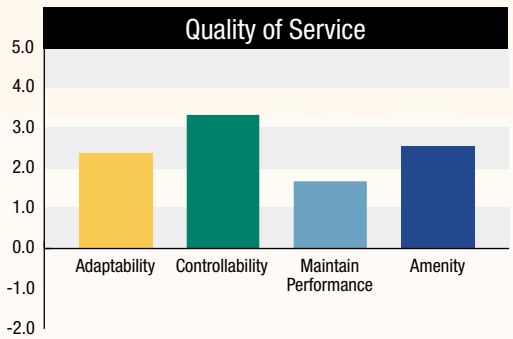
Photo by Richard Barnes

The project uses proven technology with low initial cost and fast payback. Natural ventilation is used instead of mechanical cooling. Features of the original design, such as narrow floor plates for daylighting and natural ventilation, are incorporated instead of mechanical cooling and lighting. Lighting design is intended to minimize energy use while providing pleasant light quality. Building materials were selected to minimize the impact on the environment. More than 73% of construction debris was recycled.









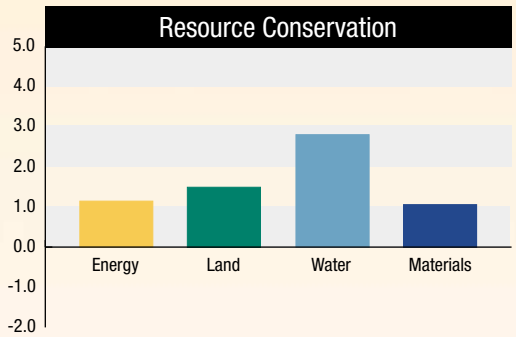
SOUTHCENTRAL REGIONAL OFFICE

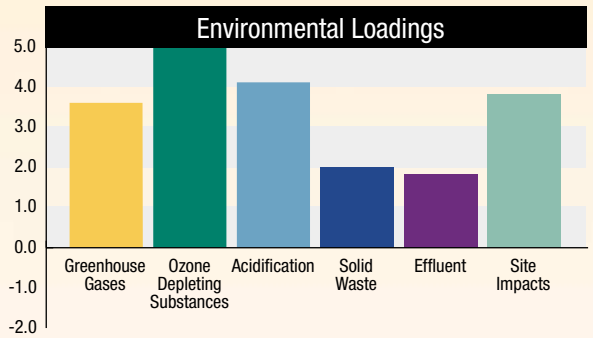
Harrisburg, Pennsylvania

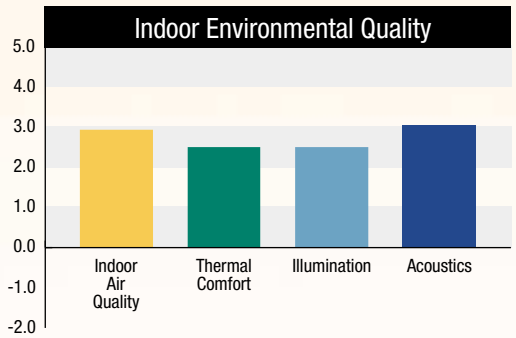
Courtesy of Pennsylvania Department of Environmental Protection

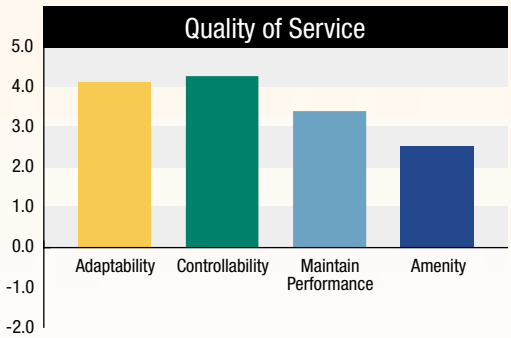
The headquarters of the Pennsylvania Department of Environmental Protection serves as a prototype for environmentally friendly construction in the state. The 73,000-square-foot building, located in Harrisburg, was constructed from sustainable sources such as wheatstraw, soybean, cork, wood, and recycled glass and steel. Energy efficient transparent shades on every window provide protection from the sun and eliminate glare within the building, which is positioned to maximize use of natural daylight.

The building also leads the trend toward a healthier, more comfortable work environment. Volatile-organic chemical levels emitted from carpet glue and furnishings have been reduced, increasing air quality, and individually controlled airflow and temperature controls placed in the floor of each workstation increase worker comfort.









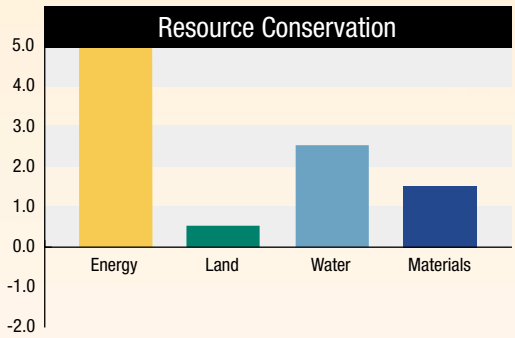
U.S. TEAM

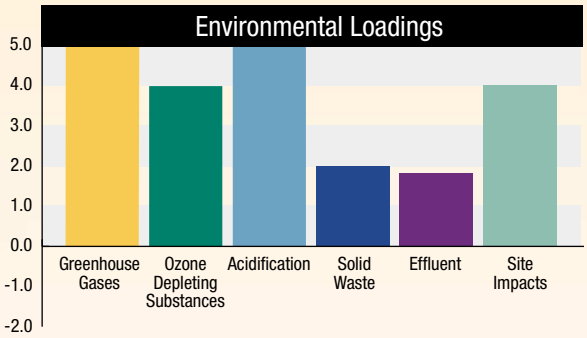
CAMBRIA OFFICE

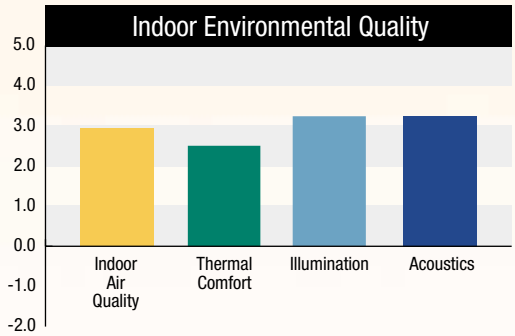
Ebensburg, Pennsylvania

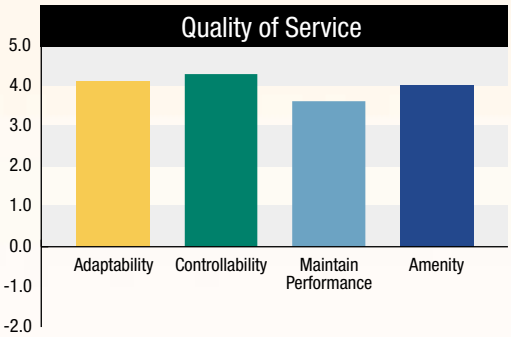
The Department of Environmental Protection is showcasing green building design in a new leased facility, a 30,244-square-foot district headquarters building along with a 9,000-square-foot garage. The building is designed to minimize the impacts on the environment from site selection and construction through to building occupancy and operation. The building was sited to take advantage of north-south solar exposure. A 12-kW photovoltaic array provides emergency power and excess generation is sold to a green power supplier. A ground-source heat pump provides HVAC heating and cooling supply as well as domestic hot water heating. Many building materials are made from recycled materials and are themselves recyclable. Lighting is designed to reduce energy consumption and cooling loads. Plumbing fixtures reduce aggregate water consumption to 20% less than the requirements in the federal Energy Policy Act of 1992.

Courtesy of Pennsylvania Department of Environmental Protection







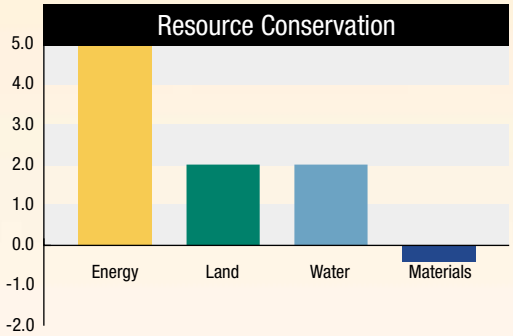


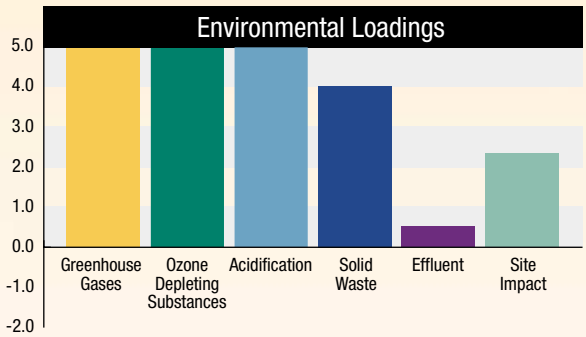
ZION NATIONAL PARK VISITOR CENTER

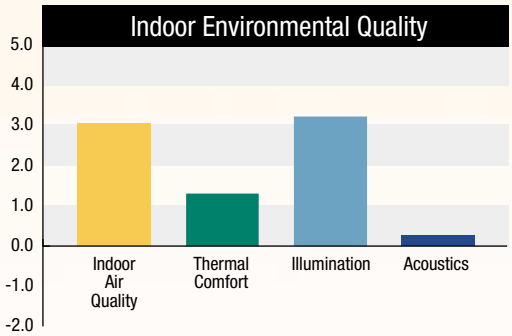
Springdale, Utah

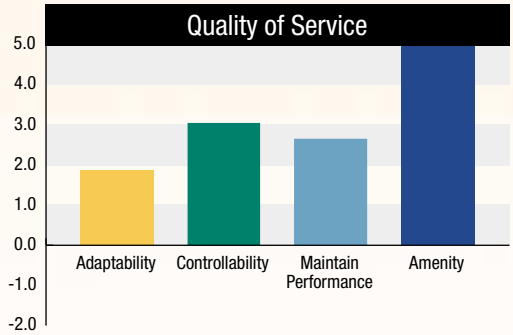
Photo by Larry Kilborn

The dramatic cliff and canyon landscape of Zion National Park is complemented by the new, highly efficient visitor center and comfort station. One of the National Park Service's most energy-efficient complexes, the 7,600-square-foot visitor center and 1,100-square-foot comfort station feature daylighting, Trombe walls for passive solar heating, downdraft cooltowers for natural ventilation cooling, energy efficient lighting, and advanced building controls. These features are expected to result in energy cost savings of about $16,000 per year. A roof-mounted photovoltaic (PV) system provides electrical power. The PV system reduces the amount of power purchased from the utility and it supplies backup power when grid power is not available.









U.S. TEAM

ADAM JOSEPH LEWIS CENTER

Oberlin College, Oberlin, Ohio

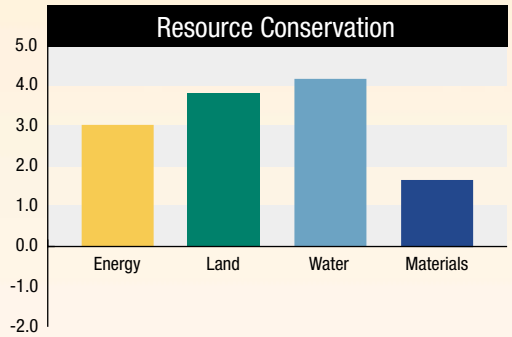
GBC 2000

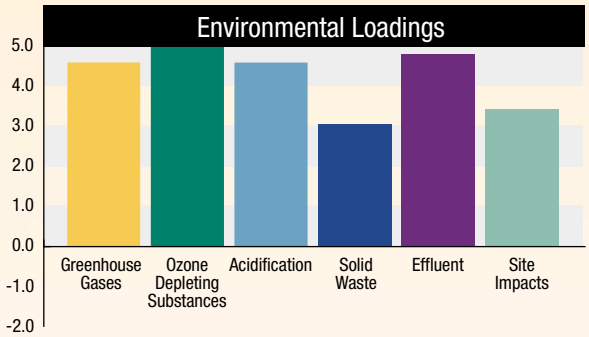
The 13,600-square-foot Adam Joseph Lewis Center for Environmental Studies at Oberlin College is not just a place to hold classes. The building supports the college's mission of educating its students to make the world a better place. The building incorporates many features that lessen its impact on the environment.

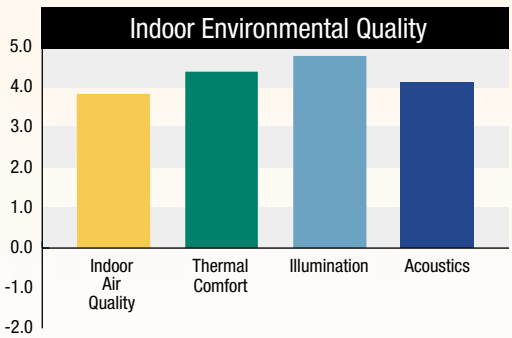
The projected energy use is 21% of the average for new construction. Energy saving measures include water-source heat pumps for heating, cooling, and ventilation. Photovoltaic panels generate electricity; roof attachments will provide for PV upgrades as technology improves. The building is designed to optimize passive solar performance and daylighting. Thermal mass in the floors and walls retains and radiates heat. Energy efficient ventilation, roof assemblies, walls, building controls, lighting, and glazing are used. From materials specification through to operation, attention has been paid to indoor air quality.

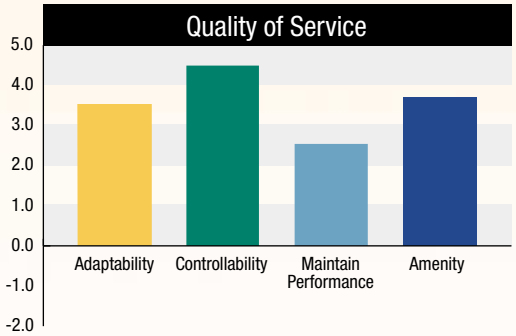
Courtesy of Oberlin College

Recycled-content materials were selected when possible. All wood is from sustainable forests. A unique building component is the "living machine," a natural wastewater treatment system, powered by sunlight, which recycles water for nonpotable greywater use.









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The U.S. projects presented here not only used and evaluated the international Green Building Challenge assessment framework but, in tandem, they used the U.S. National LEED™ (Leadership in Energy and Environment Design) green building rating system created by the U.S. Green Building Council. This allowed the U.S. Team to explore what lessons could be learned and shared from both global and national assessment perspectives.

For further information on the U.S. LEED™ Green Building Rating System, check out *www.usgbc.org* or *www.leedbuilding.org.*

In addition, the first U.S. case study template for green projects (developed for the Green Building Advisor CD-ROM) was used to compile data for all five U.S. projects. This template allows the creation of a consistent green building database. For further information on the Green Building Advisor CD-ROM, visit *www.greenbuildingadvisor.com*.

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